UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/044,284	01/11/2002	Daniel R. Lane	22-0197	8417

30050 7590 07/14/2004

PATENT COUNSEL, TRW INC.
S & E LAW DEPT.
ONE SPACE PARK, BLDG. E2/6051
REDONDO BEACH, CA 90278

EXAMINER	
DEAN, RAYMOND S	

ART UNIT	PAPER NUMBER
2684	

DATE MAILED: 07/14/2004

5

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/044,284	LANE ET AL.	
	Examiner	Art Unit	
	Raymond S Dean	2684	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1 - 23 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1 - 23 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 4.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1, 4 – 7, and 17 – 23 are rejected under 35 U.S.C. 102(e) as being anticipated by Thompson et al. (US 6,438,354).

Regarding Claim 1, Thompson teaches a satellite for routing signals on 0 to n channels to any one of M downlink beams, said satellite comprising: n first-stage switches each corresponding to one of the 0 to n channels (Figure 8 Section II (38), Column 7 lines 45 – 49); M multiplexing devices each to combine n/2 channels into one output channel (Figure 8 Section II (40), Column 7 lines 45 – 51); M second-stage switches to receive outputs from said M multiplexing devices (Figure 8 Section II (42)); and M downlink antenna ports coupled to said M second-stage switches (Figure 8 Section IV (50), the antenna ports are coupled to the switches (42) through the HPAs and third-stage switches (46)).

Regarding Claim 4, Thompson teaches all of the claimed limitations recited in Claim 1. Thompson further teaches a receive antenna or a plurality of receive antennas

to receive a beam or set of beams each on a channel or set of channels (Figure 8 Section I, Column 7 lines 36 – 37, Column 7 lines 45 – 47).

Regarding Claim 5, Thompson teaches all of the claimed limitations recited in Claim 4. Thompson further teaches means for routing each of a plurality of beams from corresponding ones of said receive antenna or antennas to said n first-stage switches (Figure 8 Section I, Column 7 lines 36 – 40).

Regarding Claim 6, Thompson teaches all of the claimed limitations recited in Claim 1. Thompson further teaches wherein said signals relate to broadband communications (Column 3 lines 37 – 41).

Regarding Claim 7, Thompson teaches all of the claimed limitations recited in Claim 1. Thompson further teaches a control unit to control operation of at least said n first-stage switches and said M second-stage switches such that each signal is routed to a desired one of said M downlink antenna ports (Figure 8 Section II, Column 7 lines 45 – 55, the switches conduct the functions of: power dividing, channelizing, and routing the signals, there is an inherent control unit that controls said functions such that said switches power divide, channelize, and route said signals properly).

Regarding Claim 17, Thompson teaches a switching mechanism for routing signals from up to n channels to any one of M downlink beams, said switching mechanism comprising: means for receiving a plurality of uplink signals each corresponding to one of n channels (Figure 8 Section I Section II (38), Column 7 lines 36 – 37, Column 7 lines 45 – 49); and means for directing signals corresponding to

each of said uplink signals to one of M downlink antenna ports (Figure 8 Section IV (50)).

Regarding Claim 18, Thompson teaches all of the claimed limitations recited in Claim 17. Thompson further teaches n first-stage switches each corresponding to one of the 0 to n channels (Figure 8 Section II (38), Column 7 lines 45 – 49), M multiplexing devices each to combine n/2 channels into one output channel (Figure 8 Section II (40), (Column 7 lines 45 – 51), and M second-stage switches to receive outputs from said M multiplexing devices (Figure 8 Section II (42), Column 7 lines 49 - 55).

Regarding Claim 19, Thompson teaches all of the claimed limitations recited in Claim 18. Thompson further teaches wherein said n first-stage switches and said M second-stage switches are configured to minimize insertion losses (Column 7 lines 5 – 7, since the OMUXs maintain minimum insertion losses and the switches ultimately route the signals to said OMUXs said switches are inherently configured to maintain said minimum insertion losses).

Regarding Claim 20, Thompson teaches a method of routing signals on a satellite, said method comprising: receiving signals on 0 to n channels (Figure 8 Section I Section II (38), Column 7 lines 36 – 37, Column 7 lines 45 – 49); and routing said signals to any one of M downlink antenna ports (Figure 8 Section IV (50), Column 7 lines 64 – 67, Column 8 lines 1 - 7).

Regarding Claim 21, Thompson teaches all of the claimed limitations recited in Claim 20. Thompson further teaches passing said signals through n first-stage switches (Figure 8 Section II (38), Column 7 lines 45 – 49), using M multiplexing devices each to

combine n/2 channels into one output channel (Figure 8 Section II (40), (Column 7 lines 45 – 51), receiving outputs from said M multiplexing devices at M second-stage switches, and passing said signals through said M second-stage switches (Figure 8 Section II (42)).

Regarding Claim 22, Thompson teaches a method of routing n signals to any one of M downlink antenna ports on a satellite, said method comprising: receiving said n signals each corresponding to a different channel (Figure 8 Section I Section II, Column 7 lines 36 – 37, Column 7 lines 45 – 49); and directing each of said signals to one of said M downlink antenna ports using n first-stage switches, M multiplexing devices and M second-stage switches (Figure 8 Section II Section IV).

Regarding Claim 23, Thompson teaches all of the claimed limitations recited in Claim 22. Thompson further teaches passing said signals through n first-stage switches (Figure 8 Section II (38), Column 7 lines 45 – 49), using M multiplexing devices each to combine n/2 channels into one output channel (Figure 8 Section II (40), Column 7 lines 45 – 51), receiving outputs from said M multiplexing devices at M second-stage switches, and passing said signals through said M second-stage switches (Figure 8 Section II (42), Column 7 lines 49 - 55).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 2 – 3 and 8 – 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Thompson et al. (US 6,438,354) in view of Reinhardt et al. (US 2003/0038547).

Regarding Claim 2, Thompson teaches all of the claimed limitations recited in Claim 1. Thompson further teaches an M/2 output switch or set of switches (Figure 8 Section II (38), Column 7 lines 45 – 49, there are a plurality of switches).

Thompson does not teach a mechanical switch.

Reinhardt teaches a mechanical switch (Section 0032 lines 1 – 6).

Thompson and Reinhardt both teach satellites comprising switches for the routing of signals thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the mechanical switch matrix taught in Reinhardt in the satellites of Thompson for the purposes of reducing the size of the switching matrices thus decreasing the weight of the satellite and increasing the degree of isolation and redundancy capability between signal paths within the switch matrices.

Regarding Claim 3, Thompson teaches all of the claimed limitations recited in Claim 1. Thompson does not teach a two-output mechanical switch.

Reinhardt teaches a two-output mechanical switch (Section 0029 lines 3 – 4, Section 0032 lines 1 – 6, Section 0035 lines 1 – 7, there can be an infinite number of different sized matrices using different combinations of inputs and outputs thus there can be a switch with two outputs).

Thompson and Reinhardt both teach satellites comprising switches for the routing of signals thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the mechanical switch matrix taught in Reinhardt in the satellites of Thompson for the purposes of reducing the size of the switching matrices thus decreasing the weight of the satellite and increasing the degree of isolation and redundancy capability between signal paths within the switch matrices.

Regarding Claim 8, Thompson teaches a satellite mechanism for routing 0 to n signals to any one of M downlink beams, said satellite mechanism comprising: a plurality of first switching devices each to route an input signal to outputs (Figure 8 Section II (38), Column 7 lines 45 – 49); a plurality of multiplexing devices to receive inputs from said plurality of first switching devices and to provide a plurality of output signals (Figure 8 Section II (40)); and a plurality of second switching devices each corresponding to one of said plurality of multiplexing devices and provided to receive said plurality of output signals (Figure 8 Section II (42)), each of said plurality of second switching devices to route a received signal to one of M antenna ports (Figure 8 Section IV (50), since the antenna ports are coupled to the switches (42) through the HPAs and third-stage switches (46) said switches (42) will route signals such that said signals can be routed to said antenna ports).

Thompson does not teach one of two outputs.

Reinhardt teaches one of two outputs (Section 0029 lines 3 – 4, Section 0032 lines 1 – 6, Section 0035 lines 1 – 7, there can be an infinite number of different sized

matrices using different combinations of inputs and outputs thus there can be a switch with two outputs thus allowing switching between one of said two outputs).

Thompson and Reinhardt both teach satellites comprising switches for the routing of signals thus it would have been obvious to one of ordinary skill in the art at the time the invention was made to use switch matrix taught in Reinhardt in the satellites of Thompson for the purposes of reducing the size of the switching matrices thus decreasing the weight of the satellite and increasing the degree of isolation and redundancy capability between signal paths within the switch matrices.

Regarding Claim 9, Thompson in view of Reinhardt teaches all of the claimed limitations recited in Claim 8. Thompson further teaches n first-stage switches each corresponding to one of 0 to n channels (Figure 8 Section II (38), Column 7 lines 45 – 49), said plurality of multiplexing devices comprises M multiplexing devices each to combine n/2 channels into one output channel (Figure 8 Section II (40), Column 7 lines 45 – 51), said plurality of second switching devices comprises M second-stage switches to receive outputs from said M multiplexing devices (Figure 8 Section II (42)).

Regarding Claim 10, Thompson in view of Reinhardt teaches all of the claimed limitations recited in Claim 8. Thompson further teaches an M/2 output switch or set of switches (Figure 8 Section II (38), Column 7 lines 45 – 49, there are a plurality of switches). Reinhardt further teaches a mechanical switch (Section 0032 lines 1 – 6).

Regarding Claim 11, Thompson in view of Reinhardt teaches all of the claimed limitations recited in Claim 8. Reinhardt further teaches a two-output mechanical switch (Section 0029 lines 3 – 4, Section 0032 lines 1 – 6, Section 0035 lines 1 – 7, there can

be an infinite number of different sized matrices using different combinations of inputs and outputs thus there can be a switch with two outputs).

Regarding Claim 12, Thompson in view of Reinhardt teaches all of the claimed limitations recited in Claim 8. Thompson further teaches routing a received signal to a desired antenna port (Figure 8 Section IV (50), Column 7 lines 64 – 67, Column 8 lines 1 - 7). Reinhardt further teaches a three-output switch (Section 0029 lines 3 – 4, Section 0032 lines 1 – 6, Section 0035 lines 1 – 7, there can be an infinite number of different sized matrices using different combinations of inputs and outputs thus there can be a switch with three outputs).

Regarding Claim 13, Thompson in view of Reinhardt teaches all of the claimed limitations recited in Claim 8. Thompson further teaches a receive antenna or plurality of receive antennas to receive a beam or plurality of beams each on a channel or set of channels (Figure 8 Section I, Column 7 lines 36 – 37, Column 7 lines 45 – 47).

Regarding Claim 14, Thompson in view of Reinhardt teaches all of the claimed limitations recited in Claim 13. Thompson further teaches means for routing each of a plurality of beams from corresponding ones of said receive antenna or antennas to said plurality of first switching devices (Figure 8 Section I, Column 7 lines 36 – 40).

Regarding Claim 15, Thompson in view of Reinhardt teaches all of the claimed limitations recited in Claim 8. Thompson further teaches wherein said signals relate to broadband communications (Column 3 lines 37 – 41).

Regarding Claim 16, Thompson in view of Reinhardt teaches all of the claimed limitations recited in Claim 8. Thompson further teaches a control unit to control

operation of at least said plurality of first switching devices, said plurality of multiplexing devices and said plurality of second switching devices (Figure 8 Section II, Column 7 lines 45 – 55, the switches, in conjunction with the IMUXs, conduct the functions of: power dividing, channelizing, and routing the signals, there is an inherent control unit that controls said functions such that said switches power divide, channelize, and route said signals properly).

Conclusion

5. Any inquiry concerning this communication should be directed to Raymond S. Dean at telephone number (703) 305-8998.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nay Maung, can be reached at (703) 308-7745. Any response to this action should be mailed to:

Commissioner of Patents and Trademarks

Washington, D.C. 20231

Or faxed to:

(703) 872-9314 (for Technology center 2600 only)

Hand –delivered responses should be brought to Crystal Park II, 2121 Crystal Drive, Arlington, VA, Sixth Floor (Receptionist). Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service Office whose telephone number is (703) 306-0377.

NAY MAUNG
SUPERVISORY PATENT EXAMINER